

***6th Symposium on the Impacts of an Ice-Diminishing Arctic
on Naval and Maritime Operations***

**U.S. Navy
Arctic Roadmap Update**



***RADM Jonathan White
Oceanographer and Navigator of the Navy
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Arctic Ice Minimum Projection

Sea Routes



Northern Sea Route

2025: 6 weeks open
41' controlling draft



Transpolar Route

2025: 2 weeks open
Deep ocean transit



Northwest Passage

2025: intermittently open
33' controlling draft

Sea route distances:
Distance from the
Bering Strait to
Rotterdam





Key Missions – Navy in the Arctic

- **Ensure U.S. sovereignty**
 - **Defend the homeland**
 - **Contribute to maritime domain awareness**
- **Ensure freedom of the seas**
- **Support the Coast Guard and other partners**
 - **Search and Rescue *in support of missions led by USCG and as directed in support of international partners***
 - **Environmental Response**
 - **Disaster Response/Defense Support of Civil Authorities**

In the near to mid-term, the Navy will concentrate on improving operational capabilities, expertise, and capacity, extending reach, and will leverage interagency and international partners to achieve its strategic objectives



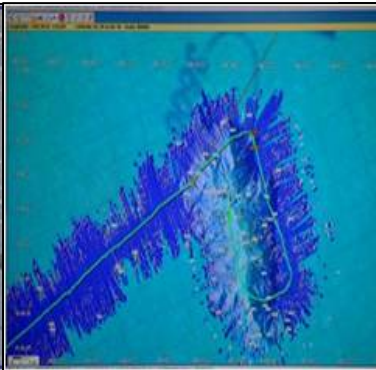
Arctic Challenges

Lack of:

- Aids to Navigation
- Ocean Bottom Surveys for Charts
- Accurate Weather Forecasts & Sea-ice Prediction
- Reliable Satellite Communications
- Fuel and Supply Depots
- Medical Facilities
- Search & Rescue Capabilities & Infrastructure
- Oil Spill Response Capabilities



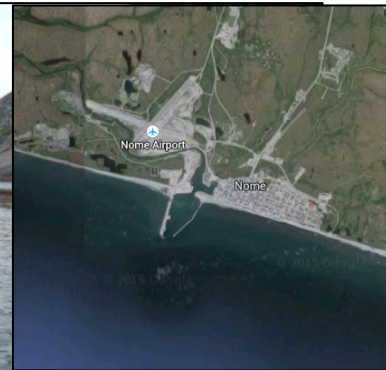
Limited ice- breaking capabilities



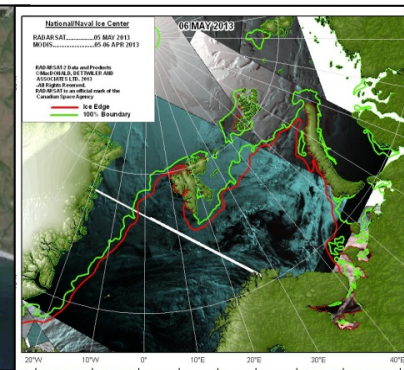
Incomplete charting



Limited SAR assets



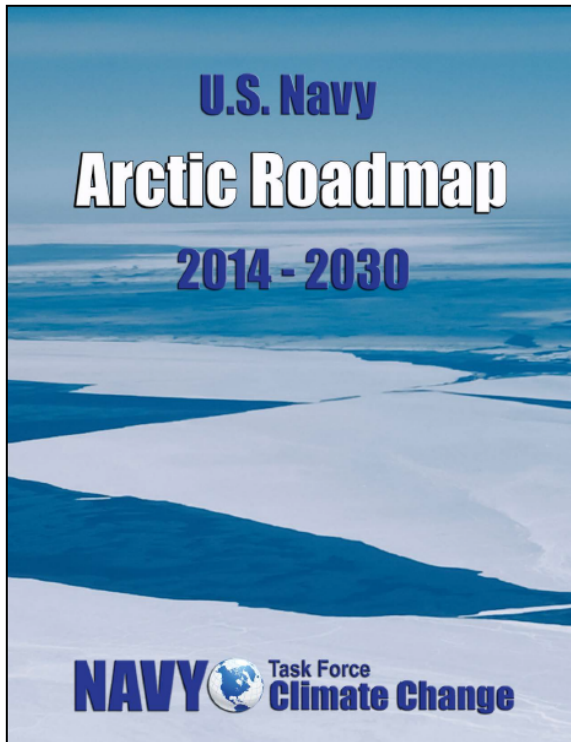
Limited Infrastructure



WX & Ice Prediction



Arctic Roadmap Update



Goal: Sustainable, Arctic-capable force recognizing partnerships are the foundation

- **Near-term** (2014-2020)
 - Refine doctrine, operating tactics & procedures
 - Enhance relationships
 - Joint international exercises, science & personnel exchanges
- **Mid-term** (2020-2030)
 - Provide operational support
 - Transition Arctic operations capability to sustained missions
 - Improve capabilities by participating in complex exercises
- **Long-term** (2030 and beyond)
 - Provide trained and equipped personnel and capabilities
 - Increased potential for SAR
 - Focus on maritime security and freedom of navigation





Arctic Roadmap Implementation



Highlights:

- Arctic Maritime Capability Requirements
- Arctic Engagement
- Update Fleet Guidance for Arctic Operations & Training
- ICEX Accelerated to Bi-annual Event
- Science and Technology Plan
- Identify / Evaluate U.S. & International Infrastructure
- Arctic Hull, Propulsion and Engineering Requirements
- International Arctic Region Hydrographic Commission → Charting Plan





Navy's National Role

Implementation Plan
for
The National Strategy for the Arctic Region
January 2014

Executive Order 13689
21 Jan 2015
Established Arctic ESC

DOD Lead:

Develop a Framework of Observations and Modeling to Support Forecasting and Prediction of Sea Ice

- Objective: Improve sea ice forecasts and predictions at a variety of spatial and temporal scales

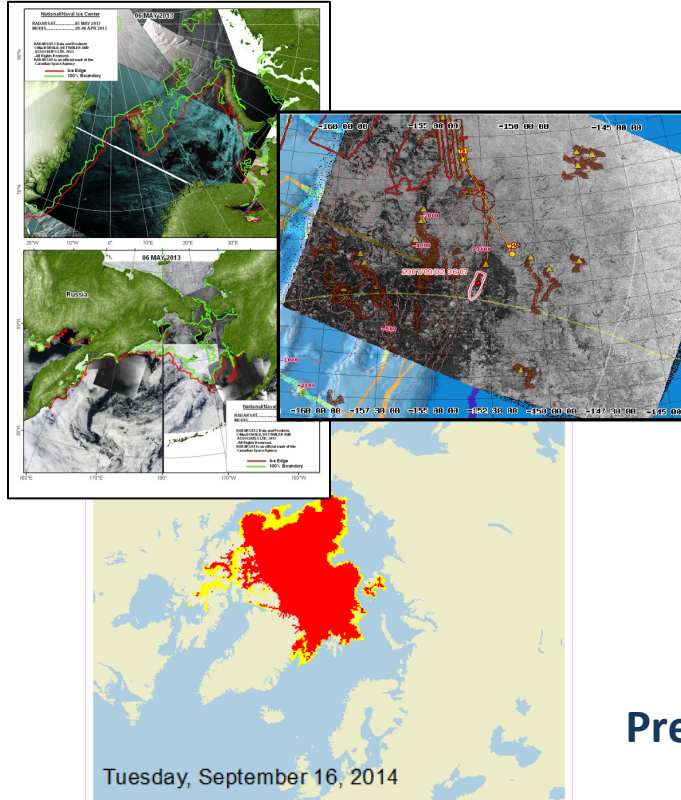
DOD Support: Charting, Models, Maritime Domain Awareness, Observations, etc.

Under Title 10 the Navy is responsible “for safety and effectiveness of all maritime vessels, aircraft, and forces of the armed forces by means of: marine data collection, numerical modeling and forecasting hazardous weather and ocean conditions. As well as the collection and processing of Hydrographic Information.”



Roadmap to Improved Arctic Forecasting Capability

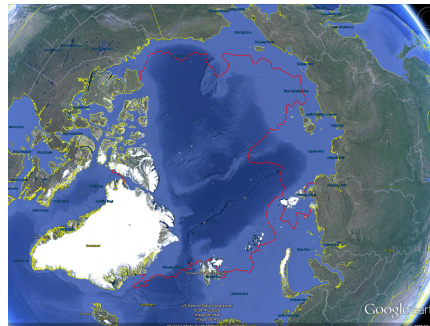
Analyze: Ice edge position and MIZ extent



Predict: Arctic Cap Nowcast/Forecast System (ACNFS)



Predict: 2-Day Ice Edge Outlook





International Engagement



Increase Arctic capabilities by leveraging opportunities for mil-mil and gov-gov collaboration with Arctic partners through:

- Improved Communication & Relationships with Arctic Neighbors
- Increased Cooperative Projects, Trainings, Operations & Exchanges by Removing Obstacles





Partnerships



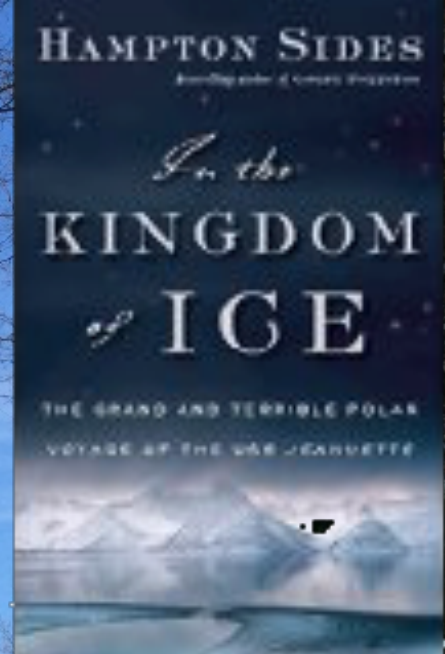
Navy Strategic Partnerships

- Assured Access
- Maritime Domain Awareness (MDA)
- Safety of Maritime Activities
- Search and Rescue (SAR)
- Law Enforcement
- Oil Spill Response





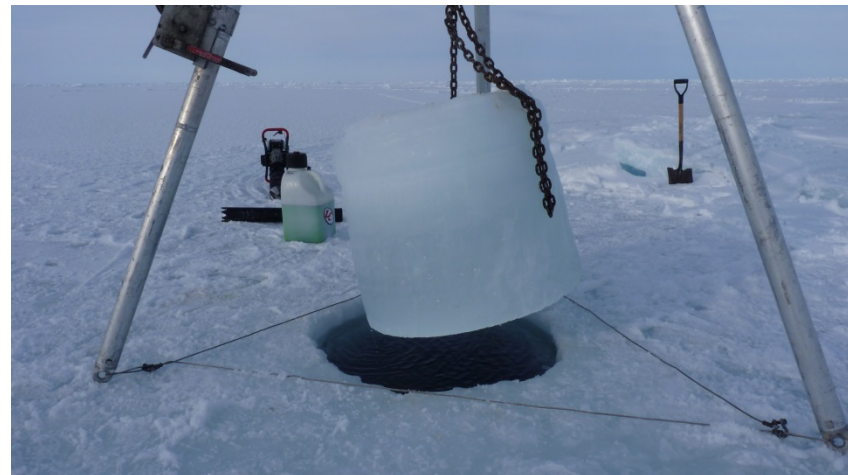
Jeanette
Expedition
1879 - 1881



The U.S. Navy has a long history in the Arctic



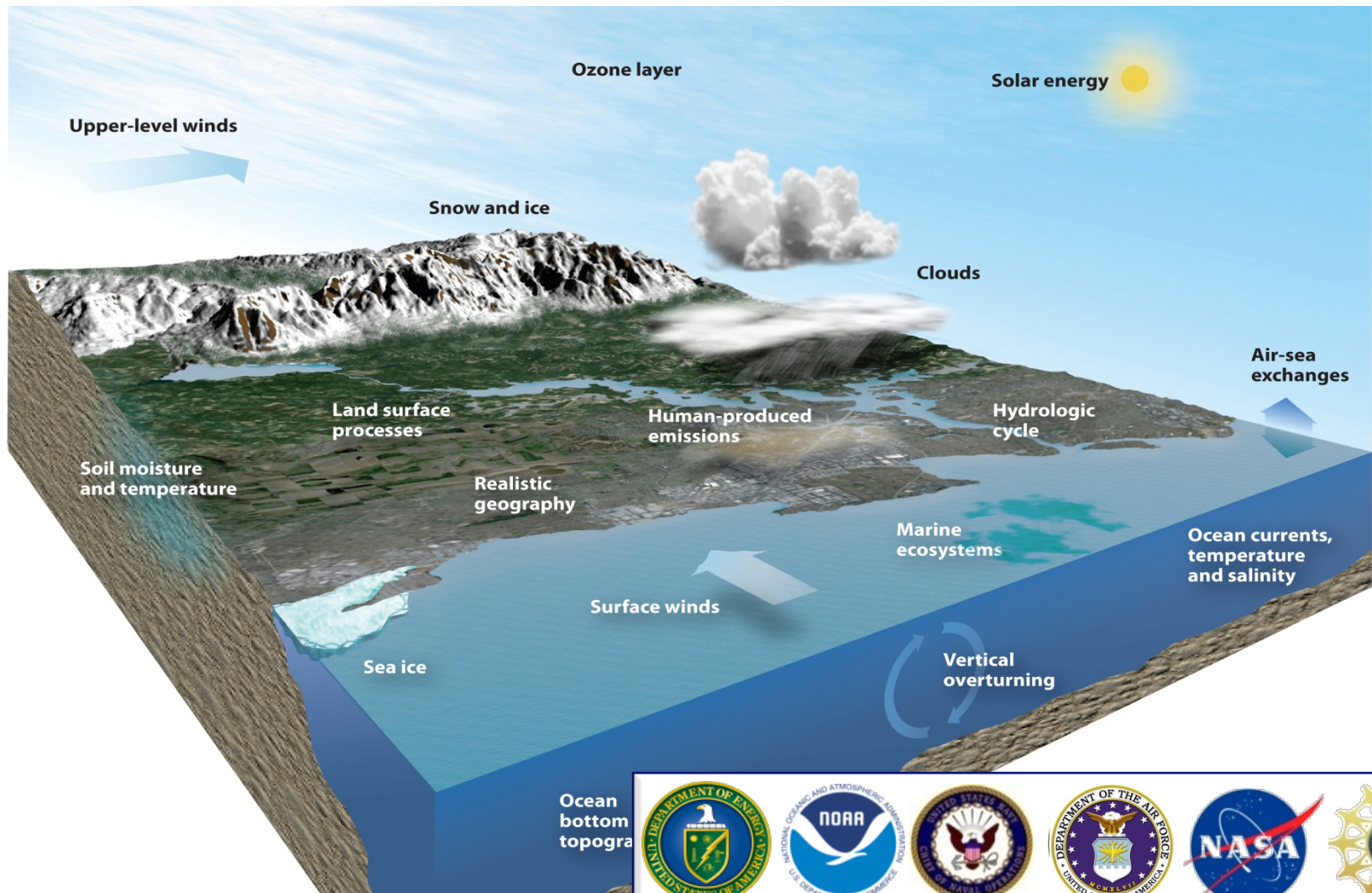
ICEX 2014





Earth System Prediction Capability (ESPC)

0 hours → 30 years: Weather, Ocean, Climate, Ice



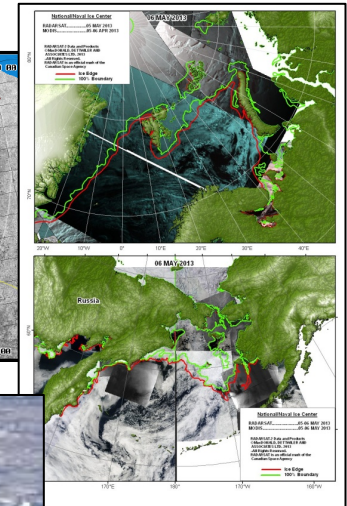
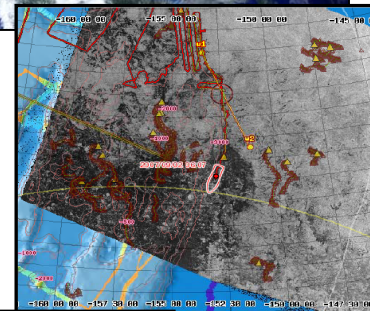
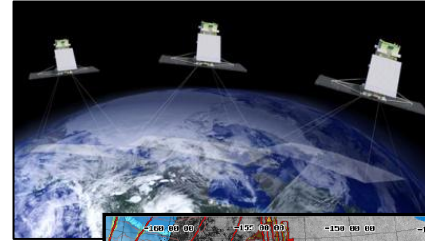
ESPC: A unifying NATIONAL effort → one “BEST” operational “model”



Enablers



- Improved Sea Ice & Weather Forecasts
- High-Resolution Arctic System Models
 - Coupled ocean/wave/ice/atmosphere
- Expanded Forecasts (7 days, 1-3 months, 1 yr, 5-10 yrs)
 - Detailed ice location, thickness, age, movement
- Platform & Sensor Development (buoys, hydrographic sensors, UAV/UUVs)
- Earth System Prediction Capability (ESPC)
- Improved Charting



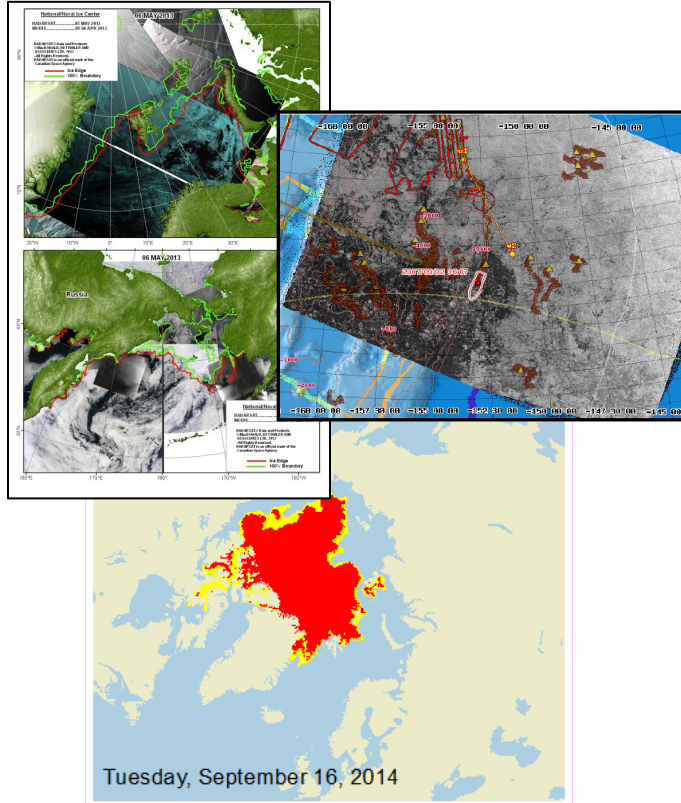
Improving forecasts and predictions to support Navy operations



Roadmap to Improved Arctic Forecasting Capability



Analyze: Ice edge position and MIZ extent



Predict:
**ESPC Regional Arctic
Coupled Model
FY 2022**



Predict:
**2 week sea ice forecast
(location, thickness, age & movement)
+
30/60/90 day Outlook**





Task Force Climate Change



Ensure informed decisions for policy development and naval operations

TFCC efforts include:

- Strategic Guidance Development
- Advocacy across DoD
- Investment Strategy
- Inter-agency & International Partnerships

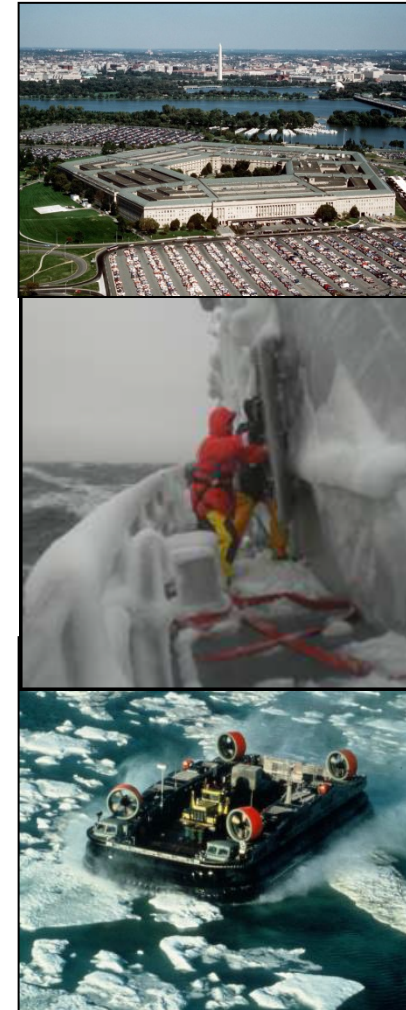


Photo Credit: Master Sgt. Ken Hammond, USAF